

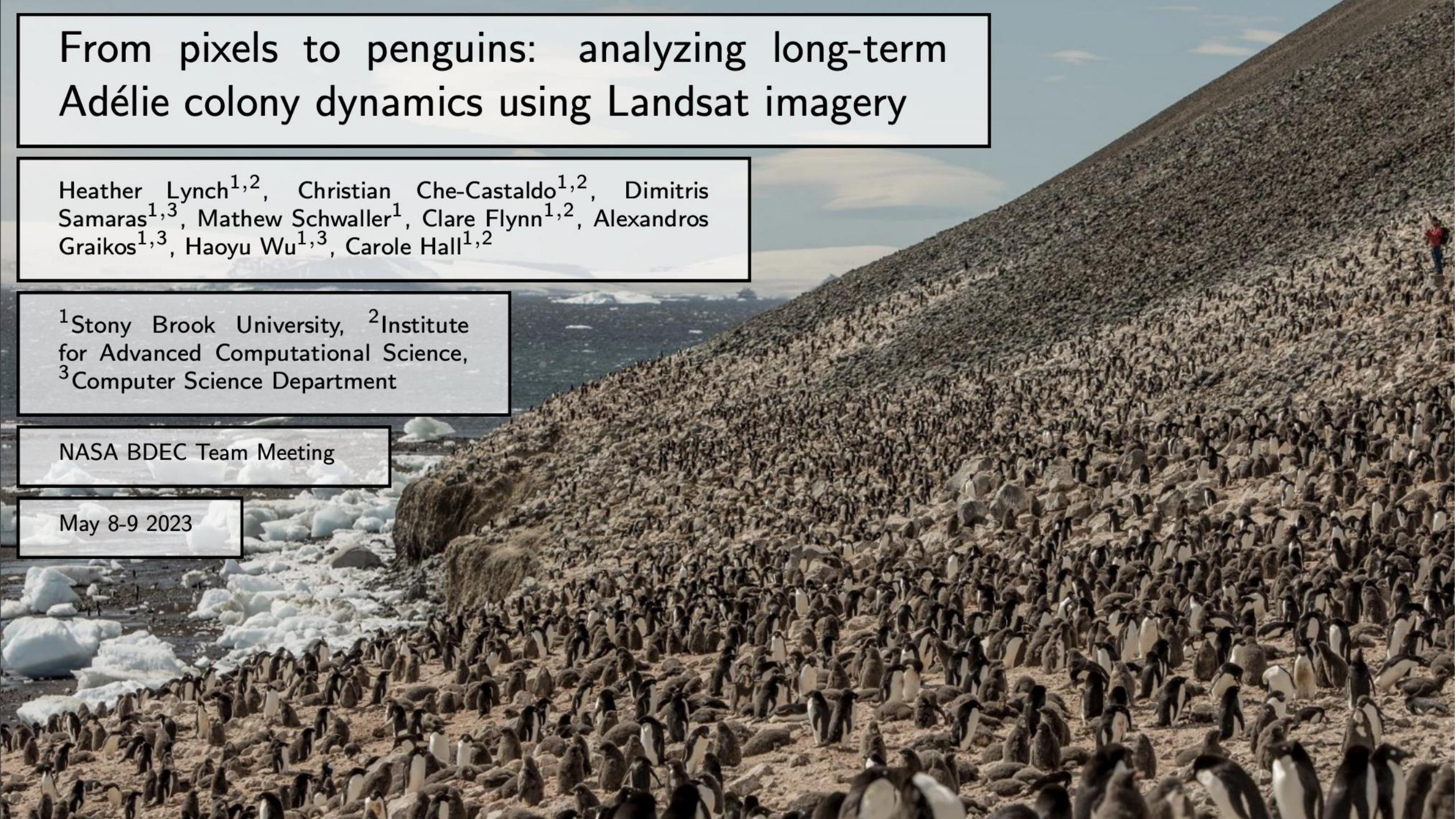
From pixels to penguins: analyzing long-term Adélie colony dynamics using Landsat imagery

Heather Lynch^{1,2}, Christian Che-Castaldo^{1,2}, Dimitris Samaras^{1,3}, Mathew Schwaller¹, Clare Flynn^{1,2}, Alexandros Graikos^{1,3}, Haoyu Wu^{1,3}, Carole Hall^{1,2}

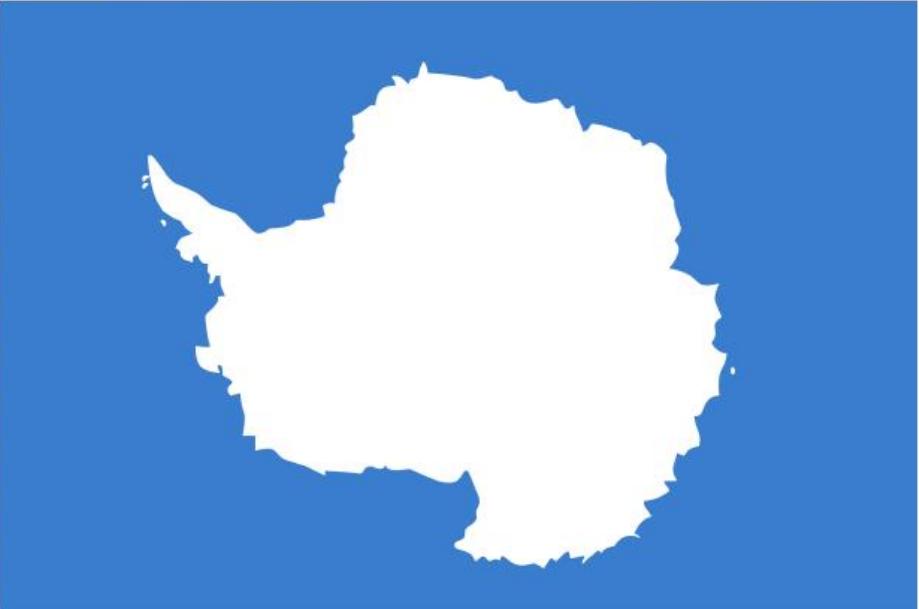
¹Stony Brook University, ²Institute
for Advanced Computational Science,
³Computer Science Department

NASA BDEC Team Meeting

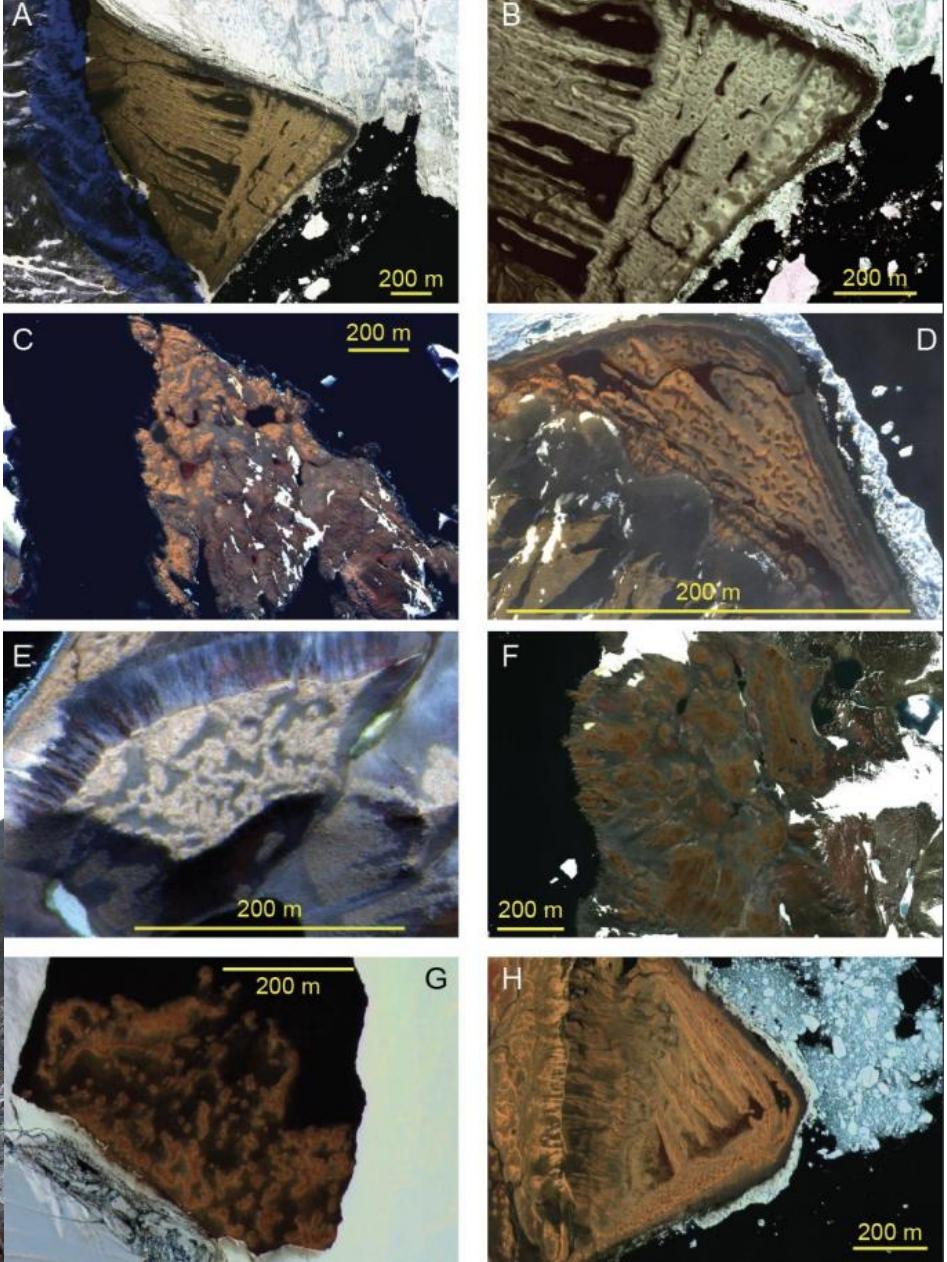
May 8-9 2023



The Adélie penguin: a bellwether of climate change



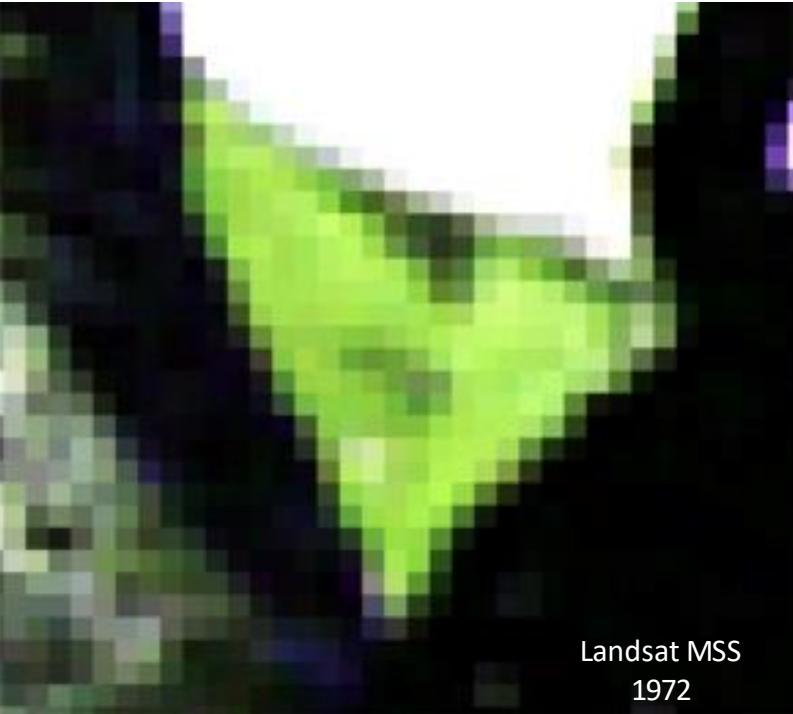
We can see penguin guano from space!



Reaching into the past & filling in gaps



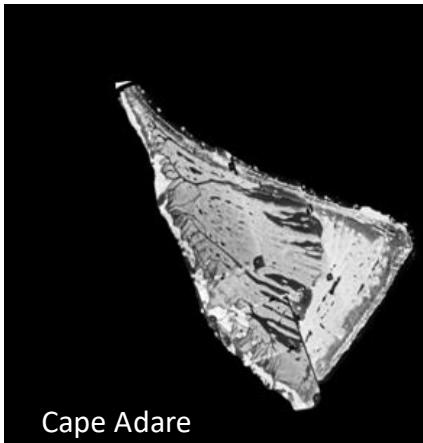
Dr. Mathew Schwaller



Landsat MSS
1972



Landsat 8
2014



Cape Adare

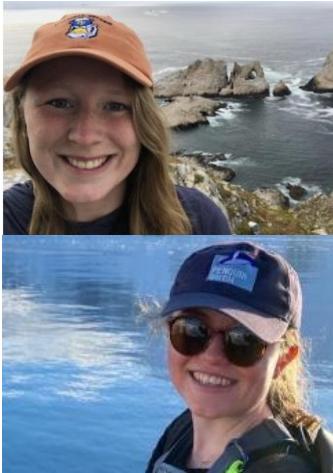
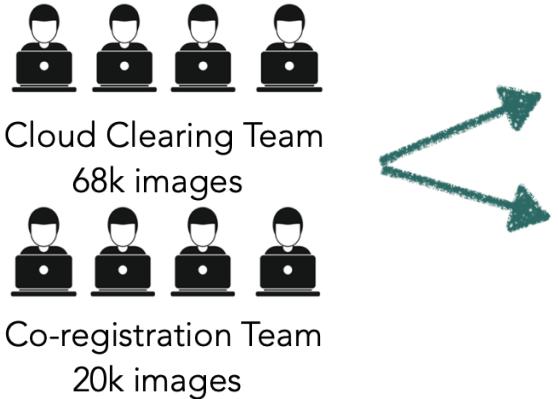


1970-1980
In field observation: < 5% of global population
Satellite observation: ~66% of global population

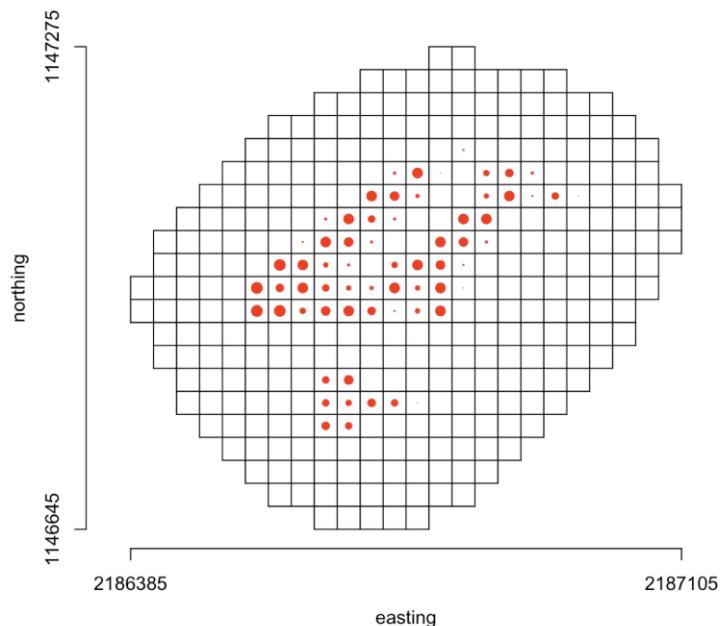
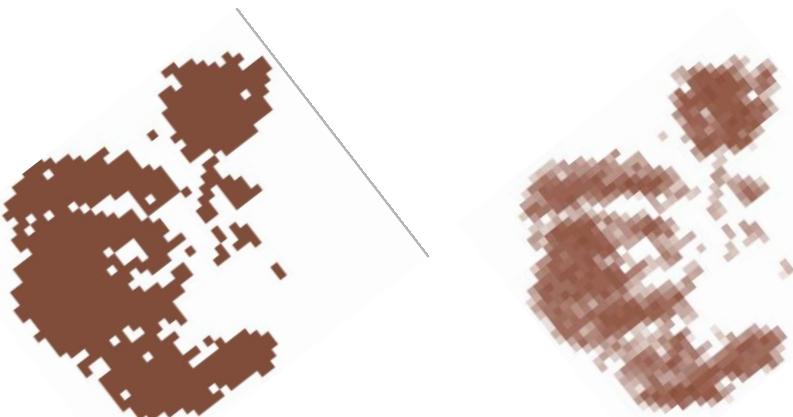
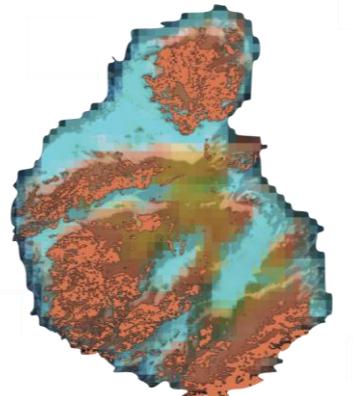
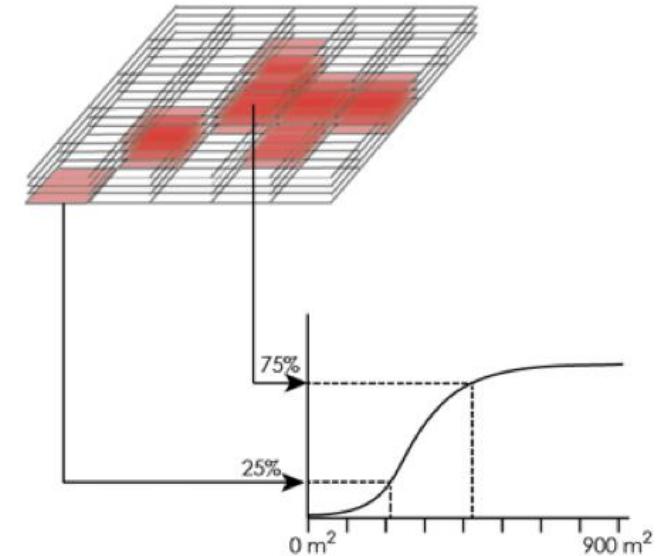
Detecting guano: an abundance estimation pipeline



Dr. Christian Che-Castaldo
Co-PI



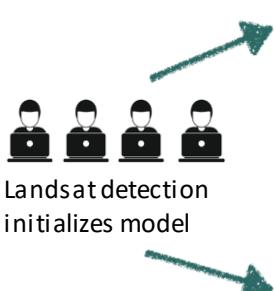
Clare Flynn & Carole Hall
PhD Students



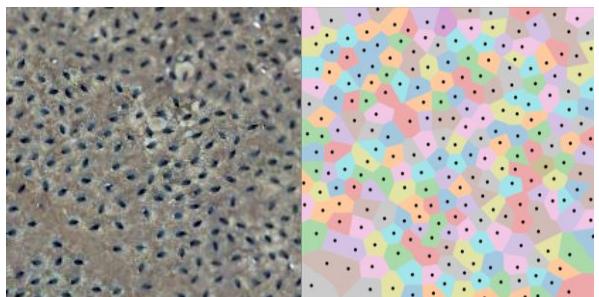
Colony shape: reconstruction & analysis



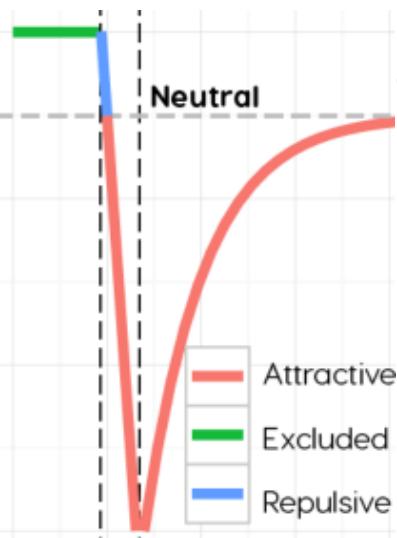
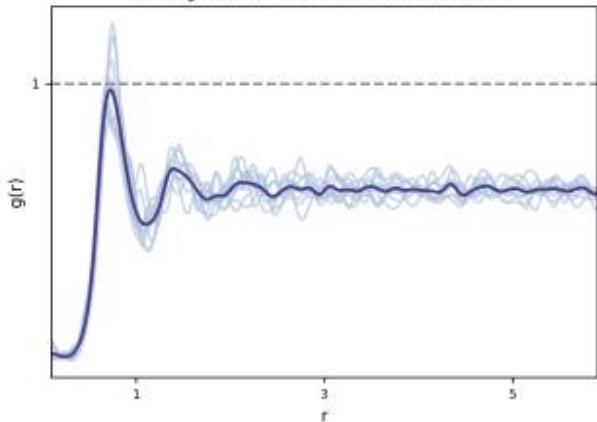
Carole Hall



Christian Che-Castaldo &
Clare Flynn



Beagle Radial Distribution Function



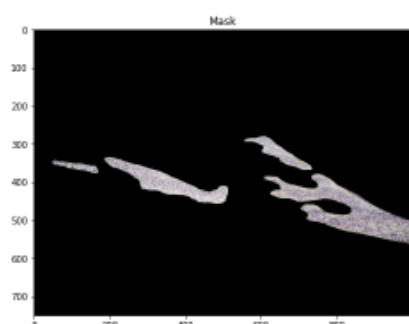
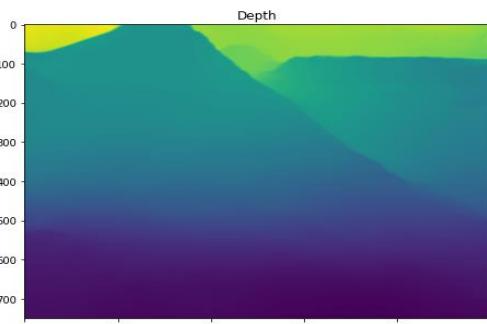
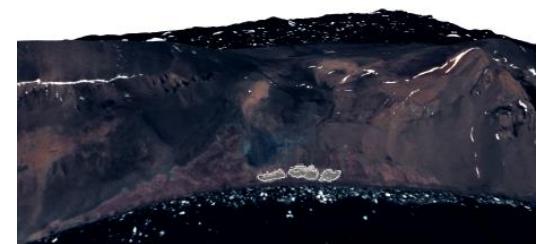
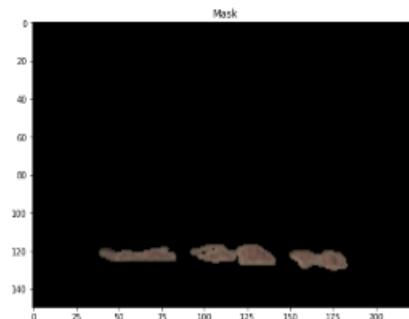
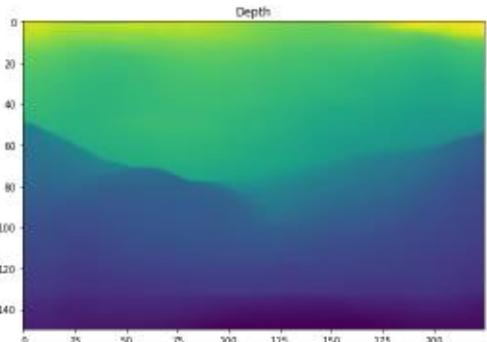
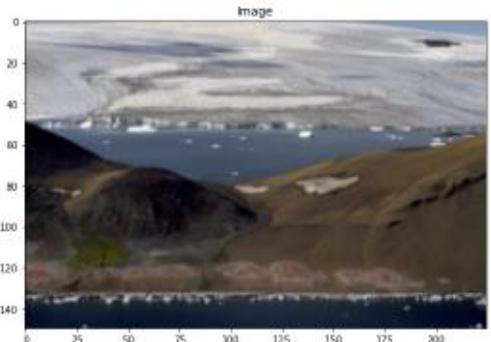
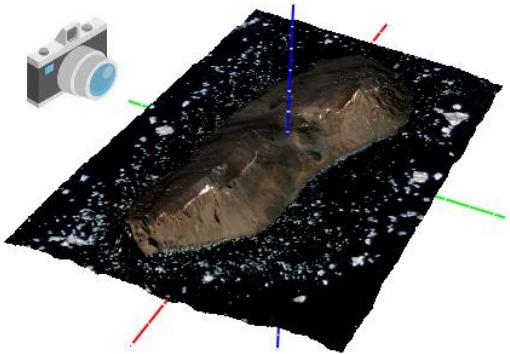
Citizen science: georeferencing tourist photos



Dr. Dimitris Samaras
Co-PI



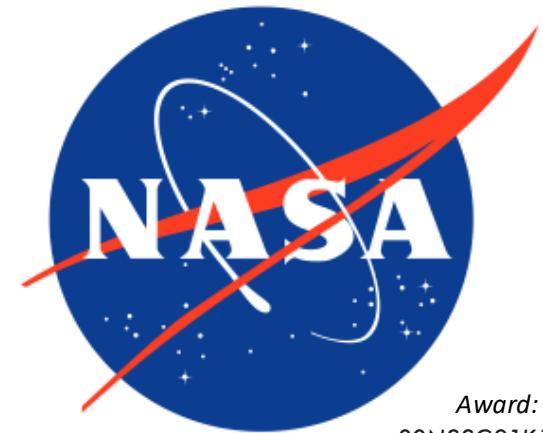
Alexandros Graikos & Haoyu Wu
PhD Students



Acknowledgments



Stony Brook University



Award:
80NSSC21K1027



Award:
2212046